REMARKS/ARGUMENTS

The present Amendment is in response to the Office Action having a mailing date of September 11, 2006. Claims 1-42 are pending in the present Application. Applicant has amended claim 21. Consequently, claims 1-42 remain pending in the present Application.

Applicant has amended claim 21 to recite that the magnetic element is configured such that the doping of the pinned layer causes the spin diffusion length to be shorter than the thickness of the pinned layer. Support fort he amendment can be found in the specification, paragraphs 35-36. Accordingly, Applicant respectfully submits that no new matter is added.

In the above-identified Office Action, the Examiner indicated that claims 1-20 are allowed. Applicant welcomes the Examiner's indication that claims 1-20 are allowed.

In the above-identified Office Action, the Examiner also rejected claim 20 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,809,909 (Hou). In so doing, the Examiner cited Fig. 1 and col. 3 of Hou.

Applicant respectfully traverses the Examiner's rejection. Claim 21 recites a magnetic element. The magnetic element includes a free layer, a spacer layer, and a pinned layer. The pinned layer includes two ferromagnetic layers separated by a conductive, nonmagnetic spacer layer. The first ferromagnetic layer has a first magnetization and a first thickness. The first ferromagnetic layer is also doped with at least a first material such that a first spin diffusion length of the first ferromagnetic layer is reduced to be less than the first thickness. The second ferromagnetic layer has a second magnetization and is doped with at least a second material such that a second spin diffusion length of the second ferromagnetic layer is reduced. Moreover, the magnetic element is configured to allow the free layer magnetization to change direction due to spin transfer when a write current is passed through the magnetic element.

Because the spin diffusion length is reduced, the ferromagnetic layers of the pinned layer have a more random spin polarization. The polarization of the spin current passing from the pinned layer to the free layer is determined primarily by the ferromagnetic layer closest to the free layer. Consequently, the spin transfer effect and magnetoresistance ratio may be enhanced. Specification, paragraphs 27-28. In addition, because the magnetic element is configured to allow the free layer magnetization to change direction due to spin transfer, a more localized phenomenon may be used to write to the magnetic element. This configuration also implies particular dimensions of the magnetic element. Specification, paragraph 36.

Hou fails to teach or suggest the magnetic element recited in claim 21. In particular, Hou fails to teach or suggest doping at least one of the ferromagnetic layer(s) of the pinned layer such that its spin diffusion length is less than its thickness in combination with a magnetic element switched using spin transfer. Hou desires to reduce parasitic current shunting, rather than reduce the polarization of spins from ferromagnetic layer(s) of the pinned layer. Hou, col. 6, lines 51-55 and Abstract. Hou's discussion of doping is thus concerned with the resistance of the ferromagnetic layers, rather than their spin diffusion length. Hou, col. 3, lines 41-48. Although Hou describes increasing the resistivities of the underlayer and the pinned layer, Applicant has found no mention of reducing the spin diffusion length of the pinned layer. More specifically, Applicant has found no indication in Hou that the spin diffusion length of at least one of the ferromagnetic layers in a pinned layer should be less than the thickness of the ferromagnetic layer. Further, Applicant can find no indication in Hou that such a modification of the spin diffusion length would be desirable. Applicant also notes that in spin transfer, current is typically driven perpendicular to the plane of the layers. Specification, paragraphs 5-6. Because current passes through the free layer in the CPP configuration, parasitic current shunting of current layers would

not be an issue. The concerns of Hou would not motivate one of ordinary skill in the art to dope the pinned layer in the manner in which Hou teaches. Thus, although Hou discusses doping to increase resistivity, Hou fails to teach or suggest doping to reduce the spin diffusion length of a ferromagnetic layer of the pinned layer below the thickness of the ferromagnetic layer.

In addition, Applicant has found no mention in Hou of configuring the magnetic element such that spin transfer can be used to switch the magnetization of the free layer. Instead, Hou teaches that the magnetic structure of Ho is a read sensor. Hou, col. 1, lines 19-30. Thus, the sensor of Hou would have its free layer magnetization changed due to an external field. Consequently, Hou also fails to teach or suggest configuring the magnetic element such that the free layer magnetization can be switched using spin transfer. For the above-identified reasons, Hou also fails to teach or suggest the magnetic element recited in claim 21. Accordingly, Applicant respectfully submits that claim 21 is allowable over the cited references.

Applicant's attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,

SAWYER LAW GROUP LLP

November 10, 2006
Date

/Janyce R. Mitchell/ Reg. No. 40,095
Janyce R. Mitchell
Attorney for Applicant(s)
(650) 493-4540